

# Economics in Program Planning for Health

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**D**OES PROSPERITY stem from the provision of health services? An early proponent of the view that health services contribute to a stronger economy was Henry Bixby Hemenway, M.D., the district health officer of Springfield, Ill. His economic justification was expressed in these terms in 1919 in an address to the vital statistics section of the American Public Health Association (1).

Fertility of soil, richness of mines, and abundance of resources for manufacture are only available in proportion as the people are strong and active. It is the special function of the health department to prevent sickness and untimely death, and particularly to wage war against those communicable diseases which attack large numbers, and against whom individual effort is inefficient. Health administration is, therefore, at the foundation of economic prosperity.

Public health administration is a business. As such it is subject to ordinary commercial laws, may be judged by commercial standards, and compared with other lines of economic activity. In the business world a concern is considered successful when it so applies scientific knowledge that it produces the greatest output with the least expenditure of money, labor, and material. . . .

The profits of public health administration must be measured by the value of lives saved and the losses which would have resulted from sickness prevented.

Before looking at some approaches of our own day that strongly resemble Hemenway's ideas, consider, as a contrast, the opinion of the Right Honorable J. Enoch Powell, then Minister of Health of the United Kingdom, in a 1961 lecture before the Royal Society of Medicine (2).

I think hardly anyone would deny that in common discussion and political debate it is assumed as axiomatic that the National Health Service is an economic asset to Great Britain; or, to generalize, that outlay on the care and treatment of sickness increases a country's wealth.

I wish to begin by examining this assumption critically; for I believe it can be shown that far from being an axiom it is in nearly all circumstances an error of which we need to clear our minds at the outset of any discussion of the relationship between health and wealth.

Powell pointed out two "errors" in the ideas he was discussing. First, he noted that a substantial part of health services is, in actuality, spent on people who have no prospect of ever again being productive or of ever becoming productive. Second, he expressed his indignation at any alternative approach to that of spending money on the health care of people regardless of their prospective productivity or lack of it. Indeed, he was not content with rejecting a selective, sharply focused use of health personnel, supplies, and equipment to keep alive only those persons who would be likely to pay off in productivity. He went on to denounce any eco-

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conomic considerations in connection with health services other than considering whether the resources for them are available (2a).

. . . it is not the health services which produce wealth, but wealth which makes possible expenditure upon the health services, like all those other expenditures of which neither the purpose nor the outcome is economic benefit but which are the specific mark of a human society and in their elaboration and refinement distinguish a civilized nation from an uncivilized, an advanced culture from a backward one. . . .

The benefits of substituting a modern operating theatre for an obsolete one, or of the development of neurosurgery, or of the changed approach to mental health, or of active geriatric techniques are not things measurable in themselves, nor, still less, measurable one against another. The impulse and driving force to do them does not arise from calculation of output or product, even in noneconomic terms: it arises from an inner compulsion which we try, but fail, to describe by such epithets as "humanitarian," or "altruistic" or "progressive," a compulsion as basic as the urge to acquire knowledge itself. These are things which mankind does, or strives to do, because it can do no other.

If the activities of the health services are thus neither justifiable by economic calculation, nor assessable in comparative statistical terms, these are characteristics which they share with all the highest activities of man.

Powell is not a member of the Labor Party, but an eminent Conservative, scheduled to be Britain's Minister of Defense if the government of the day were toppled.

### Rivalry for Tax Dollars

Powell's eloquent denunciation of economic considerations as a support for health expenditures will appeal strongly to many people in this country as well as in his own. But I think that the competition for tax money is so keen at every level of government that humanitarian considerations by themselves will not yield a big enough share of that money for health programs. Education and highways have long been successful contenders for large portions of local and State revenues. In recent years they have become important on the Federal budgetary scene as well. Recently I received from a Dutch publisher an advertisement of a book by an economist in Finland entitled, "The Interstate Highway System; A Study in Public Investment" (3). According to the publisher, the book has "a two-fold purpose: to answer the

specific question of whether the \$41 billion Interstate Highway System in the U.S. is a desirable public investment project; and to provide a general methodology for evaluating a wide range of public investment projects." This random item of news reflects the increasing emphasis, in the world at large, in appraising the economic impact of government programs—an interest which is as close at hand in this country as the nearest governor or budget officer.

Nor can we in public health solace ourselves by saying that such an approach is only for highways and other heartless ventures. Here and around the world, there is a marked upturn of interest in applying some sort of economic-benefits approach, or the like, to what is at times summed up in the phrase "the social services"—health, education, and welfare programs.

### Planning-Programing-Budgeting

In the Federal Government the Bureau of the Budget in 1965, at the direction of the President, issued instructions to all departments and agencies to establish what is called "an integrated planning-programing-budgeting system" (4-6). A basic idea in this system—that a budget is a program plan with dollar signs in it—has been familiar in the Federal budget process at least as far back as 1939, when the late Harold Smith became Director of the Bureau of the Budget. But the new planning-programing-budgeting approach is meant to carry out this idea more systematically. The intention is that the planning and budgeting practices in each agency are to provide more effective information to help everyone in the line of authority from the immediate supervisor up to and including the President to judge needs and allocate resources among competing proposals. To that end, program descriptions are intended to be what is termed "output-oriented" or "mission-oriented" or "objectives-oriented." This means that the emphasis is required to be, insofar as possible, on what is to be achieved with the money rather than on such a statement as that the money will enable us to hire 10 percent more nurses than we now employ.

The analytical methods contemplated have a variety of names, some of them synonymous

and some overlapping. These include program analysis, program evaluation, cost-effectiveness studies, cost-benefit analysis, benefit-cost analysis, and systems analysis. Such analyses may be either estimates in advance or appraisal after the fact. Advance estimates can, obviously, be of help in decision-making. Even analyses after the fact can be of help in decisions for the future.

First steps toward the planning-programing-budgeting system have been taken in connection with developing the Federal budget for fiscal 1968—the budget which the President submits to Congress in January 1967.

The planning-programing-budgeting approach emphasizes quantitative statements, both in dollar terms and in physical terms, but it recognizes that, in some types of activity, there is no end product that can be counted as handily as that of the obstetrical department of a general hospital. For example, for some purposes such a familiar concept as patient-years in a mental hospital may be needed—and that concept is a unit of measurement which lies somewhere between the dollars that health departments spend and some sort of end product.

Thus the planning-programing-budgeting approach recognizes that there is no common unit of measurement for the service produced under the Vaccination Assistance Act, the Federal financing of the construction of university library buildings, and the work of the Food and Drug Administration. No one has announced that, from now on, Univac will decide which of these ventures is likely to yield the biggest results per additional \$1,000 of expenditure.

#### **Evaluation in Water Resources and Defense**

Among Government programs, it is in water resources that cost-benefit analysis has gone farthest. There, a high proportion of outputs of water and power that are *sold* was a factor which facilitated the development of cost-benefit analysis. If a price is paid in dollars for everything that is put into a program, and if dollars are paid for the products of the program, then advance estimates as to whether the benefits will equal the costs are no more mysterious than those in a business enterprise. The estimates are subject to erroneous prediction, but it is dollars that are being counted on both

sides of the ledger. There is no mystery about the units of measurement.

However, even water resources programs do not involve that simple a framework. For example, likely products of those programs include recreation facilities, to be provided to the public at a nominal charge or with no charge.

Furthermore, the other field of government in which, by now, the idea of cost-effectiveness has gone farthest is national defense, where the products have no dollar tags at all (7). The word “products” does not mean missiles or warheads but what is done by such devices. Notice the shift of reference from cost-benefit analysis to cost-effectiveness. Cost-benefit analysis is one particular type of cost-effectiveness study, but there are other types as well. Cost-effectiveness analyses may or may not deal with benefits (that is, results) which are capable of a dollar valuation. First the desired achievement is defined, whether it is ending lives or saving them, demolishing facilities or constructing them, and then the costs of achieving the objective by alternative means are estimated.

#### **Alternative Ends or Alternative Means?**

It is in the choice among alternative paths for the pursuit of human well-being—a higher immunization level or more adequate university libraries or less thalidomide—that the decisions are hardest. There a carefully devised information system about costs and benefits will continue to demand a final resort to human judgment, but human judgment of a fully informed sort.

In considering alternative means to pursue the same objective and with the objective defined in relatively specific terms, such as reducing the death rate from chronic renal failure, the decision-making process still involves both fact and judgment, but the relative emphasis on each of those elements is greatly altered. The artificial kidney already exists, but the cost of dialysis, for chronic patients served through hospital dialysis centers, is in the neighborhood of \$10,000 to \$14,000 per patient per year. Furthermore, that money is, in large degree, the pay of highly skilled people in relatively short supply. (Dialysis for persons with acute renal failure is omitted from this discussion because its relatively brief duration for each patient

keeps its cost per case from having any resemblance to that for chronic failure, where dialysis needs to be continued for the remainder of the patient's life.)

Each year, the number of persons who face death because of experiencing a permanent loss or impairment of kidney function includes something like 3,600 patients who are medically suitable for the artificial kidney besides the large numbers who are not suitable for use of this device. "Medically suitable" means that, although the patient is likely to die soon if he does not receive dialysis, there is a reasonable chance that he will survive and lead a useful life for many years if he promptly begins dialysis and permanently continues it with the prescribed frequency. Because of the costliness of the available techniques of renal dialysis, the process has thus far been used for only a small fraction of the 3,600 cases per year. The persons who receive dialysis at demonstration centers not only get a chance to live but also provide a necessary patient-experience base for the evaluation of this therapy and for related purposes, such as training of personnel to serve added patients.

What should be done about persons in the end stage of kidney diseases, the persons who have no reasonable chance of living without permanent dialysis? Should facilities, personnel, and public funds for the existing dialysis techniques be swiftly increased to provide dialysis for (at the least) all of the medically suitable cases? Even if you ignore the fact that the concept of "medically suitable" probably would become less and less restrictive while the resources allocated to dialysis were being sharply stepped up, the total cost in money and skilled personnel would be huge were the entirety of the medically suitable group provided with dialysis at the present cost per patient per year. It took no elaborate or highly sophisticated computing to arrive, instead, at an alternative such as that which the Public Health Service has thus far pursued.

Substantial Federal funds are being provided by it for dialysis demonstration projects, and an increase of this activity, now under way, will provide this service for added patients. Funds of a size roughly similar to those for demonstration are being applied by the Public Health Service toward research and development

aimed at a reduction in the cost per dialysis patient per year, and improved efficiency in terms of the effect of dialysis on the patient, ease of use of the process, and other factors. Other funds of roughly similar size are being spent by the Service for research and development work on kidney transplantation, which might become an alternative to permanent use of the artificial kidney in the chronic cases. Other aspects of the Service's attack on the kidney diseases relate not merely to what may be done when the end stage of those diseases arrives but also to avoidance of that stage. Among these program aspects are the development and evaluation of new screening procedures for purposes of casefinding and prospective studies to learn more about the nature of the uremic syndrome (8, 9).

When the kidney disease program of the Public Health Service not only makes use of the existing techniques of dialysis but continues to put a strong emphasis on the improvement of these techniques, it is assumed that further research and development on dialysis have a high probability of markedly reducing the cost of dialysis per patient per year. The decision may conceivably prove to have been wrong; but I wish that all cost-effectiveness comparisons involved as safe a bet as this one does.

A basic idea in the present program mix is that, if the dialysis cost per patient per year can be substantially reduced, then any given amount of funds per year will serve more people. Indeed, if that intermediate goal is achieved, it is quite conceivable that a larger total amount per year will come to be spent on hemodialysis in chronic renal failure cases that it would be feasible to get for that purpose at the current high unit cost of this service.

#### **Health Services' Contribution to GNP**

One measure of the economic benefit from health programs is fatally attractive, their contribution to the gross national product. Not long ago, the very concept of the gross national product was a technical one, used by only a limited portion of the economists and statisticians. By 1960, the phrase had entered the debates of presidential candidates; so I hope that its use here does not tar me with using a private jargon of my own profession. The idea

that a bigger and bigger gross national product is a good objective of public policy has taken such a firm hold that I find some people in public health administration saying, wholly in earnest and only half in jest or not in jest at all, that a bigger expenditure for health services is desirable because it will be a contribution to the gross national product.

The synonym for gross national product is much easier to understand than GNP. It is gross national expenditure. But to urge an increase in gross national expenditure would sound profligate; a bigger "product" sounds virtuous. The gross national product is the sum of what is paid for goods and services, no matter whether produced by the private or the public sector of the economy. Hence it is the nation's product, but with the dollar size of it measured by what is paid for that product.

The awkward thing about valuing health services by what they contribute to the gross national product does not stem from the fact that health services, like other services and goods, are subject to price increases. The gross national product can be, and is, deflated to offset price rises. The awkwardness about valuing health services by what they contribute to the gross national product is that this does not distinguish a department's expenditure of \$1,000 from \$1,000 spent on krebiozen or thalidomide or bubble gum.

This does not mean that the gross national product is a snare and a delusion. In the making of decisions as to whether the nation's economy is functioning well enough, gross national product is very useful indeed, especially if you go one step farther and talk about gross national product per capita, the GNP divided by the number of people in the nation's total population. In like manner, it is important to know the total size of the nation's labor force, the total number of employed persons, and the total number of unemployed persons. These comprehensive numbers, however, only give a general idea as to how well or poorly the economy is functioning. They do not tell exactly what, if anything, should be done in order for it to function better. Certainly none of these figures reveal what kinds of jobs there ought to be more of, from the standpoint of what unmet human needs for goods and services exist

or what goods and services the now unemployed people are capable of learning how to provide.

Conceptually, there is no barrier to producing estimates which would be, for a State, what gross national product is for the nation. Thus far, there are no gross product estimates below the national level. However, it is only a slight variation on the theme of health services as a contribution to gross national product if someone says that a proposed hospital will directly provide employment to 500 people in a community and indirectly to many more. Such a measure of economic benefit is not objectionable as long as it is treated incidentally. But the heavier the emphasis given to such benefits, the more are health services viewed as an end in themselves. In economics, the most basic problem is that of deciding how to allocate limited resources—the allocation of manpower and materials among industries and within an industry. But, when economics is viewed over the course of the two centuries during which it has been a relatively distinct discipline, a persistent blunder in the allocating of resources has been to allocate them on behalf of the producers of a good or service rather than on behalf of the consumers. Hospitals, I hope, are not built on behalf of their employees but on behalf of patients, including the patients who will ultimately benefit from what is learned by residents, interns, medical students, and student nurses. At all events, if hospitals were built because of their addition to the total payroll in a county, surely a more lucrative addition to the total payroll could be devised.

### Consumers and Producers of Health Services

What I mean by the consumer interest as distinguished from the producer interest in health services is illustrated by a recent study by Florida State University made under contract with the Shellfish Sanitation Branch of the Public Health Service. The study is entitled "The Oyster-Based Economy of Franklin County, Florida" (10). That Gulf Coast county in north Florida is described as heavily dependent on "the export of products of the sea, especially oysters." The object of the study was "First, to determine the importance of the oyster industry to the residents of Franklin County . . .; and second, to estimate the mag-

nitide of the value added to oysters at various stages of production and distribution." The study concluded that about three-fifths of employment in the county was based directly or indirectly on the oyster industry (even when one omits the modest amount of employment in such work as conservation). It also concluded that the value added to the oysters during processing and distribution was three times as much as what the oyster tongs received for their catch—that value-added being, in part, something which occurs beyond Franklin County, and therefore a matter of concern to the country as a whole rather than to Franklin County alone.

Both approaches in the study give a basis for appraising the economic usefulness of whatever water-pollution control and other environmental health work may be needed to keep Franklin County oystering from disappearing—a base against which to measure the cost of added health services. Here is a focus on employment, but not employment in the health services. In relation to environmental health services, the oyster industry is a consumer, not a producer. Here also is a procedure for estimating a component of gross national product, but it is a component consisting of what people pay for oysters, not what they pay for environmental health services.

### **Economic Analysis—Yes or No?**

In public health administration, there are men of good will and good sense who are profoundly disturbed by the idea that their programs will be subject to economic appraisal. If I thought that cost-effectiveness studies and the like would lead to the evil envisaged by Enoch Powell—"not really a health service at all," he declared, "but a veterinary service, treating men as economic chattels"—I would go beyond his polite indignation and say: a pox on all economic analysts who venture into health departments. But economic appraisal of health programs is not for sinister purposes. Intelligently used, it will help to get more adequate financial support for health programs and help show us how to use money in a more effective way—for the benefit of mankind, not to its detriment. The choice is not health serv-

ices for the sake of health, or health services for the sake of greater productivity on the job, or health services designed to get a desired result with the least expenditure. All three are familiar aspects of our work, and the muted background music of the computers should not be allowed to confuse us about that.

The lack of a common unit of measurement—the dollar or something else—for comparing the achievement of public health programs to the achievement of other governmental programs, per \$1 million of additional input, means that a mathematical formula for allocating resources between health and other programs is unlikely. Similarly, the lack of a unit that is common to the outputs of the various health activities (prenatal care, air pollution control, and so on) makes it equally unlikely that a mathematical formula will be attained for allocating among those activities whatever resources are provided for health programs as a whole (11). The absence of those units of measurement limits but does not destroy the usefulness of economic criteria in program planning for health. To the extent that economic criteria are unworkable, health planners need to use other measures of effectiveness, as tangible as circumstances permit. Some already are very familiar, such as infant death rates. The shaping of an adequate assortment of these measures is a challenge in method which lies ahead. To the extent that the needful measures—economic and other—are devised and applied, the policymakers' decisions as to how to help mankind will have a broadened base of fact and a lessened reliance on intuition.

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## Research in Solid Waste Disposal Technology

In conjunction with a program authorized by the new Solid Waste Disposal Act, Public Health Service grants of more than \$800,000 have been awarded in support of 23 research projects to develop knowledge which will help the nation solve its solid wastes problems.

The projects, together with research to be performed under subsequent grants or by Federal scientists, constitute a major effort to bring solid waste disposal technology into this half of the 20th century.

With three exceptions, the research grants were awarded specifically to expand knowledge essential to eliminate or reduce health hazards from wastes.

For seven of the projects, the primary goal is information leading to the transformation of wastes into valuable products such as soil conditioners and fertilizers from animal wastes

which harbor serious human disease organisms, or charcoal, roadway tars, and boiler fuel from municipal refuse.

The objective of 13 other projects is knowledge of how to improve human health protection through new approaches to waste disposal such as burning municipal wastes on ships at sea to avoid onshore air pollution.

Three grants were awarded to help finance technical conferences to stimulate innovation in solid wastes technology.

The Office of Solid Wastes also has initiated steps to strengthen training in wastes management. Grants have been made to support solid wastes instruction for graduate engineers at four institutions. Meanwhile, special courses are being provided for government and industry personnel with responsibilities for waste disposal.